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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/588,923	06/06/2000	Iwao Okamoto	0941.64338	9435

7590

03/06/2003

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EXAMINER

RICKMAN, HOLLY C

ART UNIT

PAPER NUMBER

1773

DATE MAILED: 03/06/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/588,923

Applicant(s)

OKAMOTO ET AL.

Examiner

Holly Rickman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 17,20. 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. The rejection of claims 3-4 and 8-9 under 35 U.S.C. 112, second paragraph, is withdrawn in view of Applicant's amendments.

### *Claim Rejections - 35 USC § 103*

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carey et al. (US 6280813) in view of Wu et al. (US 6221481).

Carey et al. disclose a magnetic recording medium having a ferromagnetic CoPtCrB layer, a magnetic Co layer, a non-magnetic Ru spacer layer having a thickness of 0.6 nm, a second magnetic Co layer, and a top magnetic CoPtCrB layer disposed thereon (Fig. 3, col. 5, lines 26-51). The reference teaches that the "ferromagnetic layer" (no. 14 in Fig. 1) and the "magnetic layer" (no. 12 in Fig. 1) have magnetization directions that are antiparallel (see figures 1, 2a, and 4). The reference also teaches that the spacer layer is formed from Ru, Cr, Rh, Ir, Cu,

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and alloys thereof (col. 7, lines 52-55). As such, the reference suggests adding any one of the elements (aside from Ru) to a Ru spacer layer. The reference is silent with respect to the degree of lattice mismatch between the non-magnetic spacer layer and the adjacent magnetic and ferromagnetic layers.

Wu et al. teach that a close lattice match is desirable because it allows for smooth epitaxial growth and provides a recording medium with a high signal-to-noise ratio (see abstract).

It would have been obvious to adjust the concentrations of the various elements in the spacer layer taught by Carey et al. in order to achieve the optimal lattice parameter for optimal matching. Such an optimization would have been obvious since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Claims 1-4 and 10 require a lattice mismatch of less than 6%. It is the Examiner's contention that it would have been obvious to optimize this parameter in order to achieve optimal lattice matching and improved magnetic recording properties as a result since lattice matching affects the epitaxial growth and signal-to-noise ratio of a recording medium as disclosed by Wu et al. Such an optimization would have been obvious since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

#### ***Response to Arguments***

5. Applicant's arguments filed 12/17/02 have been considered but are not persuasive.

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Applicant argues that Wu et al. fails to remedy the deficiencies of Carey et al. That is, Wu et al. fails to teach or suggest the claimed lattice mismatch of 6% or less. Applicant acknowledges that Wu et al. teaches the benefit of a “smooth lattice match transition” but is silent with regard to an exchange layer structure having antiferromagnetically coupled magnetic layers.

The critical feature of Wu et al. that is relied upon in the rejection set forth above is that it is beneficial to lattice match an intermediate layer and an overlying magnetic layer. One of ordinary skill in the art would have reasonably concluded that this principal of lattice matching would also apply to the structure set forth by Carey et al. That is, it would have been obvious to provide as close to 100% lattice matching between the layers taught by Carey et al. in view of Wu et al.’s teaching of the benefits of smooth lattice match transitions.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Holly Rickman whose telephone number is (703) 305-2642. The examiner can normally be reached on Monday-Friday 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Thibodeau can be reached on (703) 308-2367. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Holly C. Rickman  
Primary Examiner  
Art Unit 1773

hcr  
March 3, 2003